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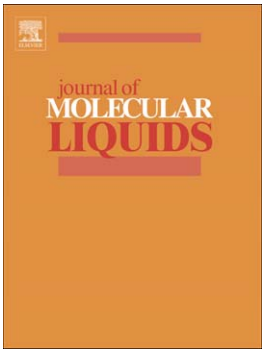

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On Darcy-Forchheimer flow of viscoelastic nanofluids: A comparative study

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Abstract: Here we are concerned with Darcy-Forchheimer flow of viscoelastic nanofluids. A nonlinear stretching surface has been employed to create the flow. Fluids are electrically conducted subject to non-uniform applied magnetic field. Results for elastico-viscous and second grade fluids are obtained and compared. Flow saturating porous space obeys Darcy-Forchheimer expression. Buongiorno model employing features of random motion and thermophoresis is considered. Boundary layer approach is involved to simplify the governing partial differential system. Convergent series solutions of nonlinear systems are developed through the optimal homotopy analysis method (OHAM). Plots for analysis of temperature and concentration fields are displayed. Numerical data of skin friction coefficient and local Nusselt and Sherwood numbers is addressed.

Keywords: Darcy-Forchheimer flow; Viscoelastic fluids; Nanoparticles; MHD; Nonlinear stretching surface; Optimal homotopy analysis method (OHAM).

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